National Climatic Data Center

DATA DOCUMENTATION

FOR

DATASET 6420b (DSI-6420b)

NOAA Research Flight Data (AOC)

January 29, 2004

National Climatic Data Center
151 Patton Ave.
Asheville, NC 28801-5001 USA

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1. Abstract:

The WP-3D aircraft perform many projects throughout the year. Examples of these projects would be hurricane research, atmospheric chemistry, thunderstorm investigations, and winter weather missions. Each of these projects consists of a series of individual flights. For instance, during hurricane projects, the P-3 may fly numerous flights through different tropical cyclones.

For each archived project, there are multiple directories consisting of individual flights. The data in these flight directories contain the actual raw meteorological parameters obtained from sensors located in different positions on the aircraft. The data is initially written to a digital data tape on the aircraft and then later converted to a file for faster processing and archiving. Each flight folder also contains a scanned image of the actual flight manifest, the navigation log, and the mission observation logs.

The flight-level data file contains measurements acquired in one second intervals. The following is a generalized list of these measured parameters: Time, GPS position data, inertial data, radar altimeter measurements, liquid water, total temperature, dewpoint temperature, attack pressure, slip pressure, differential attack and slip pressures, and static and dynamic pressure. Depending on the needs of each individual project, other sources of data will be added or subtracted from this list.

2. Element Names and Definitions:

This record contains the arrangement of the raw data from the AOC slow tape. The data are recorded as 16 bit HP words. Most of the data is recorded as integer counts and must be converted to volts and then to meaningful units. All of the navigation data is stored in a special format, and can only be read by performing special bit shifting operations. If examination of the raw navigation data is desired, ask AOC for a copy of the bit shifting subroutine called PACK.

Beginning with the 2000 Hurricane Season, locations 32-38 contain GPS data from the ASHTECH BR2G system (BR2G prefix).

This element table is accurate for the NOAA-43 Aircraft-N43RF-2003 Sar Pod, Hurricane, and Extratropical Season as well as the SFMR test flight missions.

Array Location	Description
1	Type of record (4)
2	Number of words in record (222)
3	MS byte: Slow tape ID LS byte: Aircraft #
4	Size of slow tape logical record = 220
5-10	Micro 99 time - yr,mo,da,hr,mn,sc
11-13	Time based generator 1 - hr,mn,sc; binary (not BCD)
14-16	Time based generator 2 - same as TBG 1
17-19	Collins GPS time of fix - hr, min,sec; same as TBG's
20-21	Collins GPS altitude - MS bit = -102400*32 ft
22-23	Collins GPS latitude - MS bit = -PI*4 radians
24-25	Collins GPS longitude - MS bit = -PI*4 radians
26-27	Collins GPS north vel. - MS bit = -1638.4*2 knots
28-29	Collins GPS east vel. - MS bit = -1638.4*2 knots

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30-31       Collins GPS vert. vel. - MS bit = -2048*2 ft/sec
32          BR2G GPS Data Time; 0 - 36000, lsb= 1/100 sec
33          BR2G GPS Altitude; +/- 32767, lsb= 1 foot
34-35       BR2G GPS Latitude; msb= -PI*4 radians
36-37       BR2G GPS Longitude; msb= -PI*4 radians
38          BR2G GPS Status and Horiz. Dilution of Precision
            bits 15,14: 00 - no position, 01 - uncorrected
            10 - diff corrected, 11 - almanac used
            bits 13,8: # of satellites used,
            ls byte- HDOP 00 - 99
39          Spare
40          Collins GPS north accel. - MS bit = -128 m/s**2
41          Collins GPS east accel. - MS bit = -128 m/s**2
42          Collins GPS vert. accel. - MS bit = -128 m/s**2
43          Collins GPS Ch. 1 Status 1
44          Collins GPS Ch. 1 Status 2
45-52       Collins GPS Ch. 2-5 Status -  same format as Ch. 1
53          Collins GPS Figure of Merit (FOM) word
            Note: Time FOM from word 64 is in reserved bits
            (12,11,5,4 in HP notation; 3,4,10,11 in Collins
            notation)
54          Collins GPS expected horiz. error - ls bit- 1 meter
55          Collins GPS expected vert. error - ls bit- 1 meter
            LS byte - count starting at array location 41.
56          Spare
57-58       INE 1 Altitude - MS bit = -102400*32 ft
59-60       INE 1 Latitude - MS bit = -PI*4 radians
61-62       INE 1 Longitude - MS bit =-PI*4 radians
63-64       INE 1 North Vel. - MS bit = -1638.4*2 knots
65-66       INE 1 East Vel. - MS bit = -1638.4*2 knots
67-68       INE 1 Vert speed - MS bit = -2048*2 ft/sec
69-70       INE 1 Drift Angle - MS bit = -PI*4 radians
71-72       INE 1 Heading - MS bit = -PI*4 radians
73-74       INE 1 Pitch Angle - MS bit = -PI*4 radians
75-76       INE 1 Roll Angle - MS bit = -PI*4 radians
77-96       INE 2 Data - Same as INE 1
97          APN 232 RA data in meters; 1 sec avg
98          Spare; 1 sec avg
99          Spare; 1 sec avg
100         RA - APN159 Synchro data in meters; 1 sec avg
101         RA - APN159 parallel (digital) encoder in meters
102         # of INE bursts av'd this sec; MS byte:INE 1
                                            LS byte:INE 2
103         GPS and APN232 RA burst count; ms nybble - GPS
            lat/lon/alt burst count, 2ND nyble - GPS velocity
            east/north/vert burst count,
            LS byte - APN232 RA number of words averaged
            this second.
104         # of ISEC word 98 and 99 samples avg this second;
            ms byte- ISEC(98), ls byte- ISEC(99)
105         Dig_Err: Error flags for Dig. Avg; bit 0 for APN232
106         Spare
107         ADC unit status - from ADC slow data burst
108         IAU unit status - from IAU burst
109         Operator selections: MS nybble - temp probe
                                 nybble 2 - nav. unit
                                 nybble 3 - alt. source
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                              LS nybble - dewpoint probe
110          Status from Wing Wiring Junction Box
111          Status from Cloud Physics Station
112          Status from Flight Director Station
113          Spare
114          Event switch data - Nav, Sta1, Sta2, Sta3
115          Event switch data - Nrack, Sta5, C3X, Sta7
116          Event switch data - F/D, Pilot
117          Spare
118          Spare
119          Formvar count
120          Formvar speed
121          Vaisala Cabin Pres in millibars*20; LSB is update flag
122-128      Optional user serial data
122-140      Spare
129-130      Kludge @ Fast3_4 - Prosensing SFWS & SFRR *10
131          SFMR Time (sec * 2)
132          SFMR Brightness Temp #0 (4.74 GHz)
133          SFMR Brightness Temp #1 (5.31 GHz)
134          SFMR Brightness Temp #2 (5.57 GHz)
135          SFMR Brightness Temp #3 (6.02 GHz)
136          SFMR Brightness Temp #4 (6.69 GHz)
137          SFMR Brightness Temp #5 (7.09 GHz)
138          SFMR Thermistor Data; MS byte - t3 Hot Load
                                   LS byte - t4 Dicke Load
139          SFMR Thermistor and Press; MS byte - t5 Waveguide Temp
                                        LS byte - Internal Press (PSI * 10)
140          SFMR Update Status
                  Bit 0-1  - Freq 0  |
                  Bit 2-3  - Freq 1  |  00 - No update
                  Bit 4-5  - Freq 2  |  01 - Normal
                  Bit 6-7  - Freq 3  |  10 - Warm cal
                  Bit 8-9  - Freq 4  |  11 - Hot cal
                  Bit 10-11- Freq 5  |
                  Bit 12   - Thermistors
                  Bit 13   - Pressure
                  Bit 14   - Clock
                  Bit 15   - Prosensing WS & RR - Kludge
141          M99 10 msec tic when time was read - use for clock
             drift tracking.
142          J-W Liquid water
143          RMST TOTAL TEMP #1
144          RMST TOTAL TEMP #2
145          Dew Point 1 (DW1)  GENERAL EASTERN
146          AP Alpha (attack) Pressure
147          DAP Differential Alpha Pressure
148          BP Beta (slip) Pressure
149          DBP Differential Beta (slip) pressure
150          PSW Rosemount static pressure from wingtip(#1281)
151          PQW Rosemount dynamic pressure from win#tip(#1281)
152          RD  Radiometer Down measures SST (PRT-5)
153
154          RS  Side (CO2) radiometer temperature
155
156          Vertical Acceleration 2
157          Vertical Acceleration 1
158          RADOME ATTACK PRESSURE
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159	RADOME SIDESLIP PRESSURE
160	RADOME DIFF. PRESSURE (RPQ)
161	RADOME IMPACT PRESSURE
162	Total Temp #3 (fast response) Port side
163-165	Spare
166	DEWPOINT #2 (DW2) Edge Tech 137
167	Spare
168	AIR Lyman Alpha Hygrometer
169	DEWPOINT #3 TDL
170	Spare
171-172	Spare
173	King Liquid water
174	PSF - COPILOT ROSEMOUNT #1281 (FUSELAGE)
175	PQF1 - COPILOT ROSEMOUNT #1281 (FUSELAGE)
176	PQF2 - COPILOT ROSEMOUNT 1221F(FUSELAGE)
177	TT1 Heater Current
178	TT2 Heater Current
179	LICOR H2O Absorption
180	LICOR Enclosure Pressure
181	LICOR Rate - X
182	LICOR Rate - Y
183	LICOR Rate - Z
184	LICOR Acceleration - X
185	LICOR Acceleration - Y
186	LICOR Acceleration - Z
187	LICOR Sample Pressure
188	Spare
189	Spare
190	AXBT CHANNEL #1
191	AXBT CHANNEL #2
192	AXBT CHANNEL #3
193-205	SPARE
206	SFMR Brightness - B3 4.55 GHz
207	SFMR Brightness - B5 5.64 GHz
208	SFMR Brightness - B7 6.96 GHz
209	SFMR Brightness - B8 7.22 GHz
210	SFMR Brightness - B6 6.34 GHz
211	SFMR Brightness - B4 5.06 GHz
212	SFMR Temp - T8 Rcvr Noise Src
213	SFMR Temp - T7 Rcvr Ref Load
214	SFMR Temp - T6 Antenna Left
215	SFMR Temp - T5 Antenna Right
216-221	Spare
222	Checksum for this second

3. Start Date: 20030801

4. Stop Date: 20031231

5. Coverage:

a. Southernmost Latitude: 17.0 N
b. Northernmost Latitude: 29.0 N
c. Westernmost Longitude: -97.0 W
d. Easternmost Longitude: -62.0 W

6. How to Order Data:

Ask NCDC's Climate Services about costs of obtaining this dataset.
Phone 828-271-4800
Fax 828-271-4876
E-mail: **NCDC.Orders@noaa.gov**

7. Archiving Data Centers:

Name: National Climatic Data Center/NCDC
Address: Federal Building
151 Patton Ave.
Asheville, NC 28801-5001
Voice Telephone: 828-271-4800

Name: Aircraft Operations Center
Address: Science and Engineering Division
P.O. Box 6829
Macdill AFB, FL 33608-0829
Voice Telephone: 813-828-3310
Fax: 813-828-5061

8. Technical Contact:

Flight Director's Name: Martin Mayeaux or Paul Flaherty
Address: Aircraft Operations Center
P.O. Box 6828
Macdill AFB, FL 33608-0829
Voice Telephone: 813-828-3310
Fax: 813-828-5061

9. Known Uncorrected Problems:

None

10. Quality Statement:

Disclaimer: This data is the raw flight-level weather data that has not been quality controlled for sensor contamination or other instrument related errors.

11. References:

Merceret, F.J., and Davis, H.W., 1981: The Determination of Navigational and Meteorological Variables Measured by NOAA/RFC WP3D Aircraft.